US Army Corps
of Engineers
North Central Division

GREAT LAKES LEVELS

Update Letter No. 96 July 2, 1993

Aquatic Life of St. Marys River

The gateway to beautiful Lake Superior is through Sault Ste. Marie, Michigan and Ontario. The April 1993 Update Letter No. 93 provided the history behind the St. Marys Rapids and the world famous Soo Locks. This Update goes a step further by describing another asset famous to the St. Marys River and an industry that not only promotes it, but enhances

In 1920, Ernest Hemingway wrote, "At present the best rainbow trout fishing in the world is in the rapids of the Canadian Soo." The fish habitat is still good and has improved through the efforts of two private hydropower entities located at Sault Ste. Marie, Great Lakes Power Limited in Canada and Edison Sault Electric Company in the United States. In 1985, the two companies joined forces and through the auspices of the International Lake Superior Board of Control, constructed a fishery remedial wall, extending some 2400 feet downstream from the 16-gated compensating works i.e.; fishery remedial works (Figure 1). This provided the natural environment and water depths, needed to create a fish habitat in the St. Marys rapids.

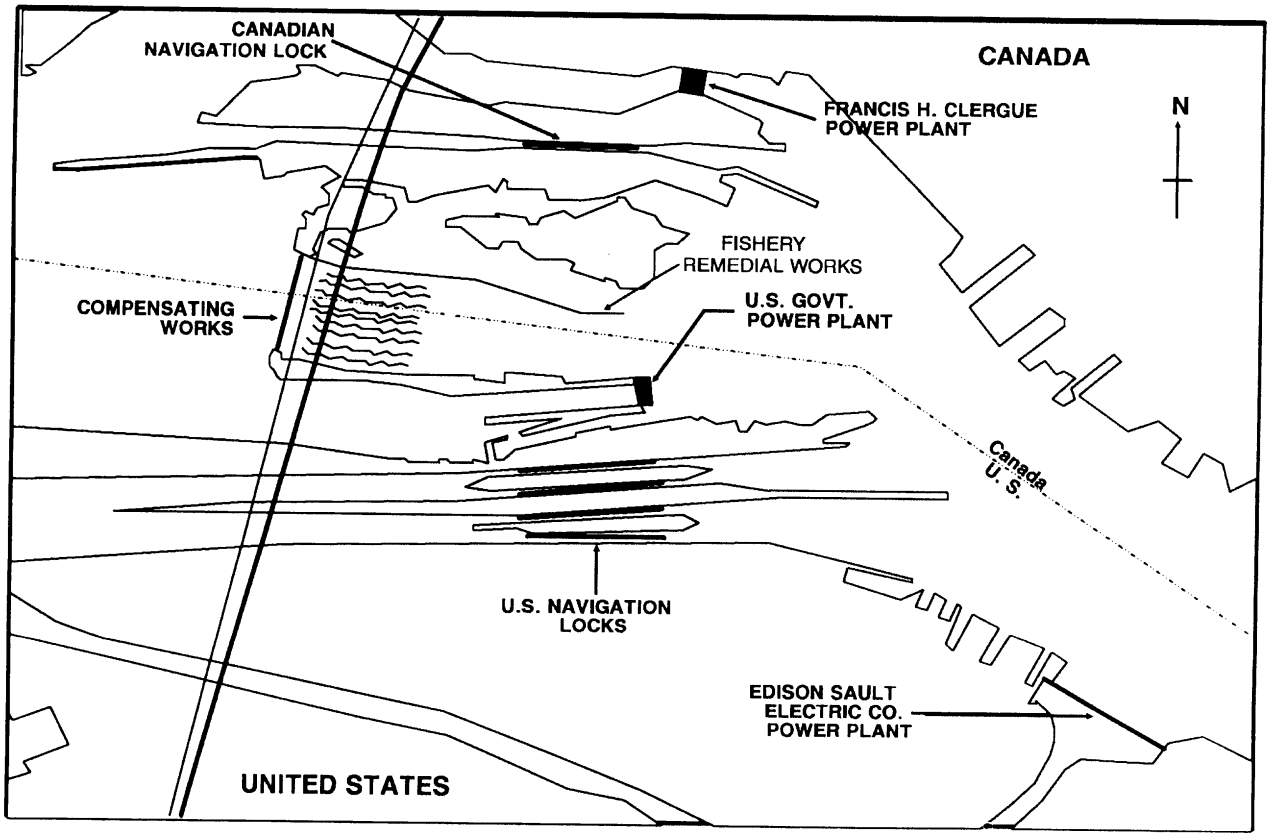

Figure 1. Lake Superior Control Structures and Fishery Remedial Works on St. Marys River, Ontario

The Edison Sault Electric company, hereafter referred to as Edison Soo, also played an important role in the introduction of additional species of gamefish into the St. Marys River. Their efforts initially began in 1976, through a cooperative agreement with the Lake Superior State University (LSSU). Edison Soo provided at no fee, their 2-1/4 mile long intake power canal as an Aquatic Research Laboratory (Figure 2). The canal acted as a near perfect hatchery providing plankton and water movement which are ideal for raising gamefish.

The initial idea involved hatching of whitefish eggs, then raising the fry from the egg yolk stage to the fingerling stage. In past fish culture history, fish managers had been unsuccessful in doing this, but Dr. Gale Gleason, of LSSU, had the idea that the live plankton in the water would serve to feed the small fish beyond the egg yolk stage. In 1977 and 1978, this experiment proved successful and showed its potential for future hatchery managers.

Because of the location of the fish lab, and the ability to corral fingerlings in an unused penstock, the first chinook salmon plant in the St. Marys River was conducted at the lab site in May of 1977. This initial planting was successful, as have been similar plants since that date.

From the late 1970s until 1981, the lab was dormant. However, with the support of the Edison Soo Board of Directors, the officials of the University were persuaded to reopen the lab. Through the 1980s the Aquatic Lab grew from one raceway to four, with the capability of raising up to 100,000 fingerlings (Figure 3). Financial support for the expansion of the lab came from a variety of grants, including Edison Soo and the Soo Area Sportsman Club. Working together under the guidance of the Michigan Department of Natural Resources (MDNR), the lab has successfully raised and planted Kamloops rainbow, steelhead trout, and chinoock salmon. In the mid 1980s, the Aquatic Lab and its work with Atlantic salmon became part of the targeted program for the State of Michigan's Research Excellence Fund for furthering economic development on the St. Marys River. Currently, the University receives monies from this program as part of its general fund. Most of the workers at the lab are students enrolled in a biology-related curriculum at the

Figure 2. Edison Sault Electric Power Canal

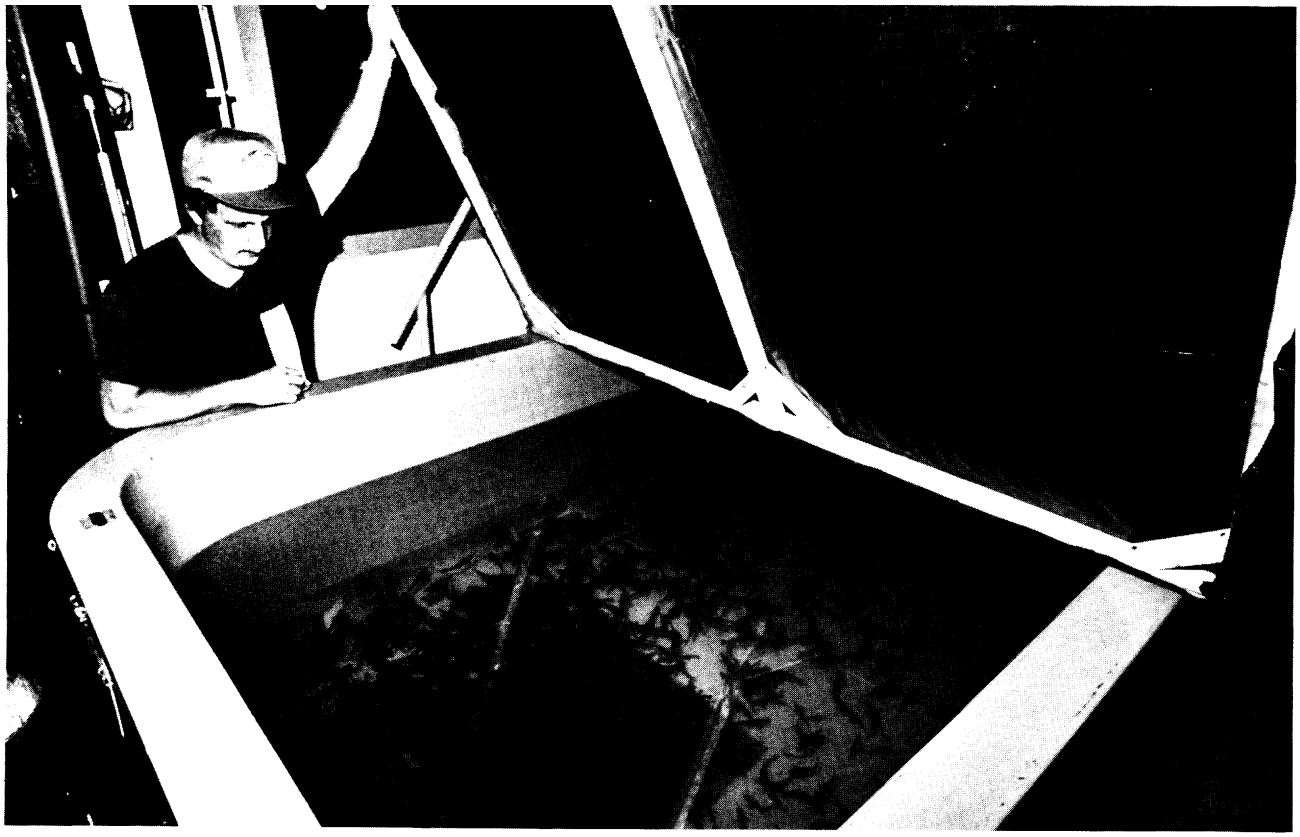

Figure 3. Aquatic Research Laboratory Rearing Pool (LSSU photograph)

Figure 4. Tagging of Fingerling at the Aquatic Laboratory (LSSU photograph)

University. The Aquatic Research laboratory is one of a few fish hatcheries associated with a university. It offers educational opportunities to LSSU students ranging from learning hatchery operations to conducting senior thesis research projects. The Lab is one of the reasons LSSU students do extremely well in post-graduate studies.

The Aquatic Lab also tags Atlantic salmon (Figure 4). Atlantic salmon released by the laboratory are marked with "spaghetti" tags inserted beneath the dorsal fin. Many fish released between 1987 and 1991 have lost their tags and, consequently, most fish are now being fitted with microscopic wire tags embedded in their heads.

Any trout or salmon with a clipped adipose fin (the small fleshy appendage located on the fish's back, between the dorsal fin and tail) should be reported to the Aquatic Lab or MDNR office. The fins are clipped to mark those fish which have microscope wire tags embedded in their heads. Fishermen who catch a fin-clipped fish should record the fish's weight and length, along with the date and location where it was caught, and submit the information, along with the fish head, to a local MDNR office or the Aquatic Lab. The Soo Area Sportsman's Club in Sault Ste. Marie, Michigan as well as the Sault and District Anglers Association of Sault Ste. Marie, Ontario have also made it possible for the Aquatic Lab and MDNR to offer cash prizes (through a lottery) for returned tags.

By analyzing information provided by anglers who have returned tags and reported their catches of Atlantic salmon, the Aquatic Lab Staff have determined that the fish seem to migrate to Lake Huron, returning to the St. Marys River in early summer. The fish spawn in the fall, and do not die after spawning as Pacific salmon do.

Atlantic salmon begin showing up near DeTour, Michigan at the mouth of the St. Marys River in late May. The best fishing near Sault Ste. Marie is from mid-June until the end of July, although experienced anglers find success well into the fall.

Methods of fishing vary. Anglers fishing from boats have been successfully catching Atlantic salmon using everything from downriggers to troll spoons. Those fishermen along shore and near the St. Marys Rapids catch fish using flies or spoons. Fly fishermen, casting for whitefish from behind the Edison Soo Plant, have successfully caught several species of salmon.

In 1980, Sault Ste. Marie had its first annual salmon derby, with over 700 participants registered. The river was a beehive of activity from the middle of August until the end of September. This year's derby will be held from August 28 - September 11, 1993.

Aquatic Toxicology Laboratory

In 1990, Canada's Forestry Pest Management Institute (FPMI) constructed a temporary, experimental apparatus in a corner of the LSSU Aquatic Lab. With the assistance of LSSU facility, staff and students, FPMI conducted short-term tests to measure the effects of forest herbicides on aquatic insects. The success of this arrangement led to the development of a permanent facility.

On August 10, 1992, LSSU, together with FPMI, announced a cooperative effort for aquatic toxicology research. The facility is located within the LSSU Aquatic Research Laboratory. The toxicology laboratory was constructed with contributions from the U.S. Forest Service, Edison Sault Electric Company and the McCollough Group. Experiments on aquatic insects and fish conducted by students, LSSU staff and Forestry Canada staff in the new toxicology laboratory will determine the effects of insecticides and herbicides, which are currently used, or are being developed for forest pest management programs.

Sea Lamprey

Sea lampreys are quintessential predators and have found the St. Marys River to be the ideal habitat. Historically, streams where the lamprey spawn and lay their eggs have been treated chemically and/or electrically to kill lamprey larvae. This technique has worked well on smaller rivers, but on a river system as large as the St. Marys, those tried and true techniques become economically and logistically infeasible.

The U.S. Fish and Wildlife Service has contracted with the LSSU Aquatic Laboratory for assistance in trying a new methodology in the war on sea lamprey. Fish and Wildlife personnel, and Aquatic Lab staff and students, place traps in areas of the rivers where the lamprey tend to congregate. Captured male lamprey are transported to Sault Ste. Marie, Ontario, where Canada's Department of

Fisheries and Oceans trucks them to Hammond Bay, Michigan for sterilization. The goal of this international effort is to have sterilized males released into 21 Lake Superior streams, where they spawn with females to yield unfertilized eggs. It is estimated that the St. Marys lamprey population could decrease by 70 percent. Currently, a count is underway of the number of males and females caught incidentally (Figure 5). In an effort to learn more about the lamprey and their migratory patterns, some females are clipped in the dorsal fin to indicate when they were caught. They are later released downstream.

Additional Information

For more information on LSSU's Aquatic Laboratory write:

Aquatic Laboratory
Lake Superior State University
Sault Ste. Marie, MI 49783

Dan Donarski of the Sault Chamber of Commerce can be contacted at (906) 632-3301 for additional information on the Sault Ste. Marie area and Atlantic fishery.

Acknowledgment

Many thanks to Mr. William Gregory, President of Edison Sault Electric Company and Mr. Tom Pink of Lake Superior State University for materials provided for the preparation of this article.

Lake Ontario Update

We have been keeping you informed on the Lake Ontario high water conditions since Update Letter No. 92, dated March 1, 1993. We reported last month on the high flow tests being carried out by the International St. Lawrence River Board of Control (Board). A total of 7 one-day tests were conducted from May 20 to June 11. A future Update Letter

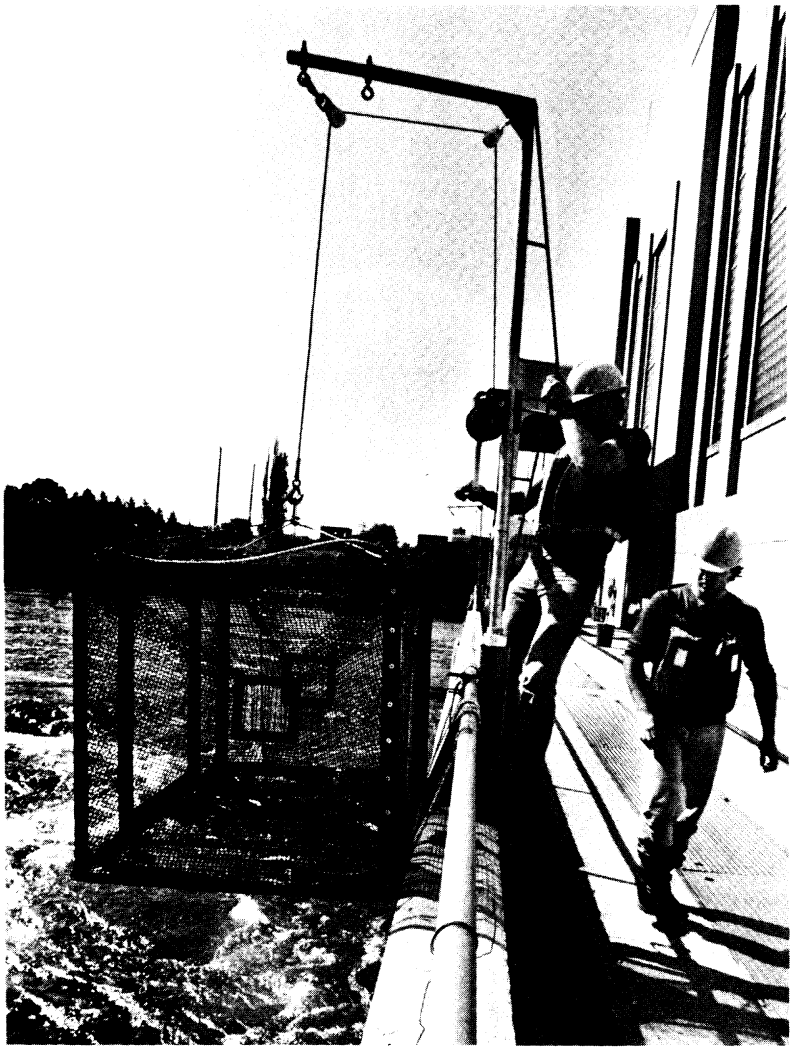

Figure 5. Trapped Sea Lamprey (LSSU photograph)

will feature these tests and the field observations, currently being analyzed.

The level of Lake Ontario is declining to upper limit of 247.29 feet. The lake peaked on May 7th at 248.20 feet. Regulating of Lake Ontario and the operations of the Board this past winter and spring successfully averted much more serious conditions. Without the extraordinary actions taken by the Board, the level would have peaked at 248.98 feet, over 9 inches higher. If the St. Lawrence Seaway and Power Project had not been built and outflows regulated, the lake would have peaked at about 249.38 feet, over 14 inches higher than what was actually experienced (see Figure 6).

JOHN W. MORRIS
Colonel, EN
Commanding

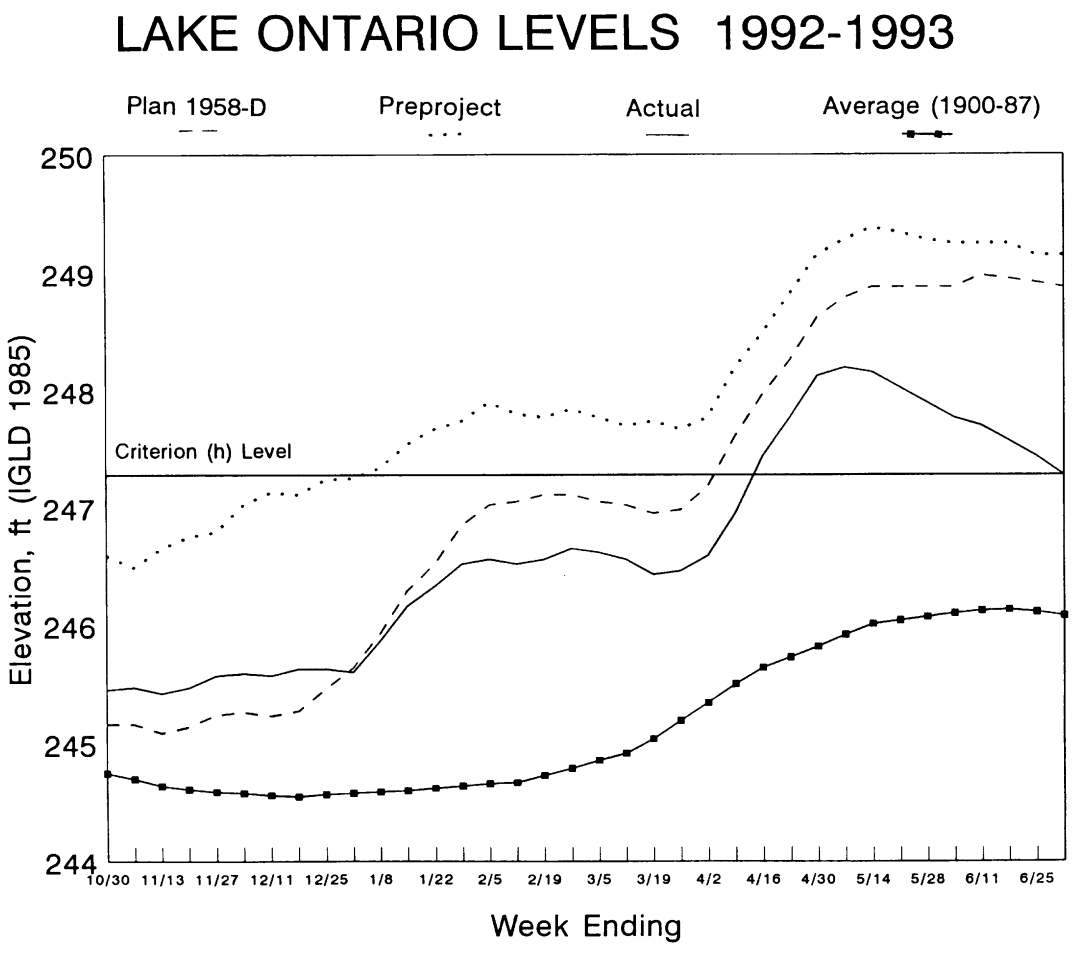

Figure 6. Benefits of Lake Ontario Regulation

Great Lakes Basin Hydrology

In June, both the water supply and precipitation to each of the basins in the Great Lakes region were above average. As a result, the actual June water levels on Lakes Michigan-Huron, St. Clair, Erie and Ontario were slightly higher than last month's predicted June levels. Compared to long-term averages (1900-1992), the June monthly mean level of Lake Superior is about average, while Lakes Michigan-Huron, St. Clair, Erie and Ontario are 8, 13, 15 and 17 inches respectively above average. Based upon the above information, shoreline residents of Lakes St. Clair, Erie and Ontario should continue to monitor water level and weather conditions, as they may affect their property. Further information and advice will be provided by the Corps of Engineers should conditions worsen.

The precipitation, water supplies, and outflows for the lakes are provided in Table 1. Precipitation data include the provisional values for the past month and the year-to-date and long-term averages. The provisional and long-term average water supplies and outflows are also shown.

Table 1
Great Lakes Hydrology[1]

PRECIPITATION (INCHES)								
BASIN	JUNE				YEAR-TO-DATE			
	1993[6]	AVG.[7]	DIFF.	% OF AVG.	1993[6]	AVG.[7]	DIFF.	% OF AVG.
Superior	3.6	3.3	0.3	109	13.8	13.1	0.7	105
Michigan-Huron	4.5	3.1	1.4	145	16.5	14.6	1.9	113
Erie	4.5	3.4	1.1	132	18.4	17.0	1.4	108
Ontario	4.0	3.1	0.9	129	18.4	16.7	1.7	110
Great Lakes	4.2	3.2	1.0	131	16.2	14.8	1.4	110

LAKE	JUNE WATER SUPPLIES[8]		JUNE OUTFLOW[3]	
	1993[2]	AVG.[4]	1993[2]	AVG.[4]
Superior	173,000	158,000	87,000	78,000
Michigan-Huron	337,000	204,000	200,000[5]	193,000
Erie	59,000	30,000	230,000[5]	214,000
Ontario	80,000	42,000	354,000	261,000

[1]Values (excluding averages) are based on preliminary computations.
[2]Cubic Feet Per Second (cfs)
[3]Does not include diversions
[4]1900-89 Average (cfs)
[5]Reflects effects of ice/weed retardation in the connecting channels.
[6]Estimated
[7]1900-91 Average
[8]Negative water supply denotes evaporation from lake exceeded runoff from local basin.

For Great Lakes basin technical assistance or information, please contact one of the following Corps of Engineers District Offices:

For NY, PA, and OH:
COL John W. Morris
Cdr, Buffalo District
U.S. Army Corps
of Engineers
1776 Niagara Street
Buffalo, NY 14207-3199
(716) 879-4200

For IL and IN:
LTC David M. Reed
Cdr, Chicago District
U.S. Army Corps
of Engineers
River Center Bldg (6th Flr)
111 North Canal Street
Chicago, Il 60606-7206
(312) 353-6400

For MI, MN, and WI:
COL Brian J. Ohlinger
Cdr, Detroit District
U.S. Army Corps
of Engineers
P.O. Box 1027
Detroit, MI 48231-1027
(313) 226-6440 or 6441